Is it illegal to waste food?

– A study on applying the Swedish Environmental Code in food control for reduced food waste

Är det olagligt att slänga mat?

- En studie om tillämpning av miljöbalken i livsmedelskontroll för minskat matsvinn

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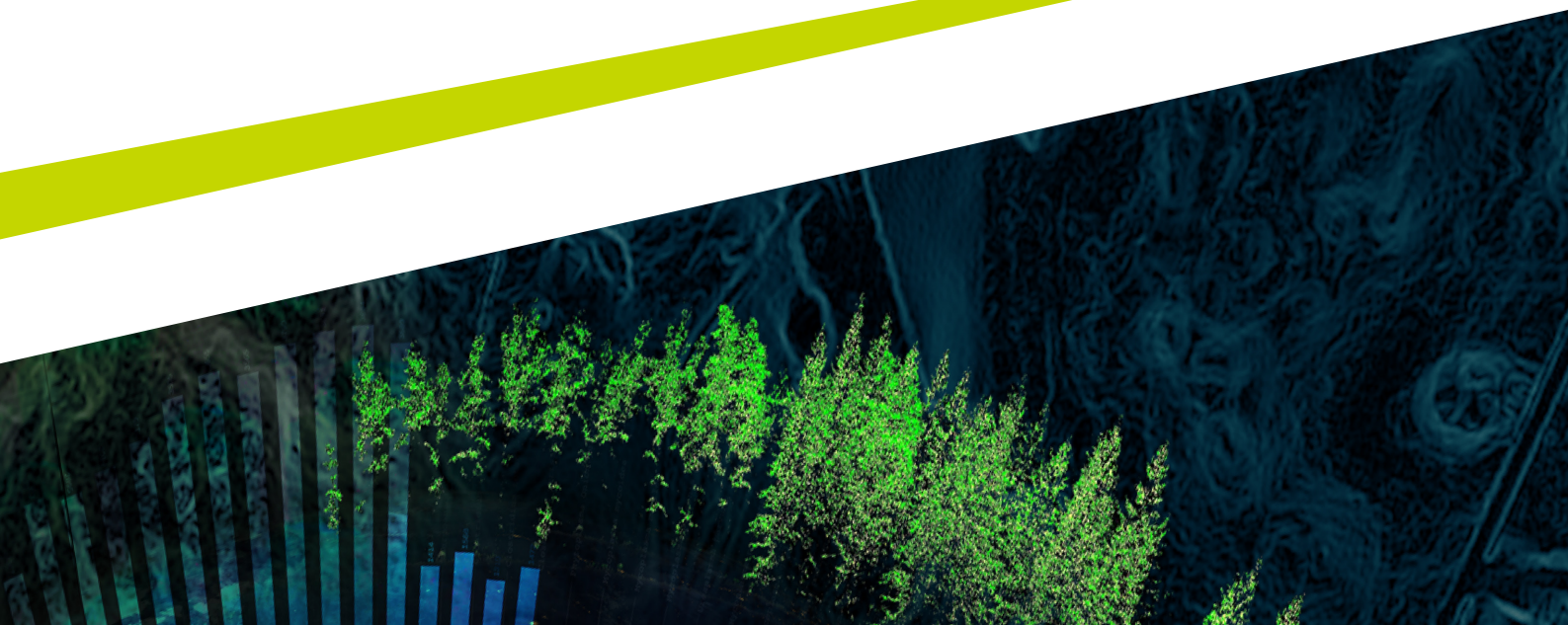

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Abstract

One third of all food produced for human consumption globally is lost or wasted, making food waste a major problem from both an economic, social and environmental perspective. One way of preventing food waste is through legislation. In Sweden, food inspectors have been recommended to work according to the general rules of consideration (GRC) in the Swedish Environmental Code to reduce food waste. However, there is a lack of published information on whether the GRC are applied to reduce food waste at present, and, if so, how this works in practice. Moreover, the lack of a common standard for food waste quantification is a problem recognized by researchers.

Thus, the present study aimed to examine whether and how the GRC are or *can be* applied to prevent food waste. More specifically, the goal was to investigate the attitude of municipal supervisory authorities and other relevant actors towards applying the GRC in food control, and to identify opportunities and / or obstacles to this. This is expected to contribute with knowledge that in the long term can generate supervisory approaches for reduced food waste.

A qualitative research method was used including self-administered questionnaires. Answers were obtained from 11 municipalities and six additional actors including courts, national authorities and a private law firm. After a thematic analysis of the data, this was sorted to describe 1) The current situation in municipal supervision / the current application of the GRC according to other actors 2) The attitude towards applying the GRC in supervision for food waste reduction 3) The attitude towards suggested supervisory practices for reducing food wastage.

The results showed that most of the actors surveyed did not apply the GRC to food waste currently, and none of them had issued injunctions to prevent food waste. Nevertheless, it was found that applying the GRC to food control could be possible, according to some practical experience in the field and the majority of the respondents' attitudes. No apparent unsolvable obstacles were identified. How the application of the GRC to food waste would work in practice remains to be solved, though. Consequently, the link between the current situation, the attitudes towards applying the GRC in food control as well as the attitudes towards suggested supervisory practices, was found to be ambiguous. Legal contradictions justify the need for further research, which could pursue the development of a supervisory approach for food waste prevention.

Keywords: food waste, food control, supervision, supervisory authority, food inspector, food waste quantification, food legislation, general rules of consideration, Swedish environmental code

Sammanfattning

En tredjedel av all mat som produceras globalt går förlorad eller slösas bort, vilket gör matsvinn till ett omfattande problem ur både ett ekonomiskt, socialt och miljömässigt perspektiv. Ett sätt att förebygga matsvinn är genom lagstiftning. I Sverige har livsmedelsinspektörer rekommenderats att arbeta enligt de allmänna hänsynsreglerna i miljöbalken för att minska matsvinnet. Det saknas emellertid publicerad information om huruvida hänsynsreglerna används för att minska matsvinn för närvarande, och hur detta i så fall fungerar i praktiken. Dessutom är avsaknaden av en gemensam standard för kvantifiering av matsvinn ett problem enligt forskare.

Den aktuella studien syftade således till att undersöka om och hur miljöbalkens hänsynsregler tillämpas eller *kan* tillämpas för att förebygga matsvinn. Mer specifikt var målet att undersöka de kommunala tillsynsmyndigheternas och andra relevanta aktörers inställning till att tillämpa hänsynsreglerna i livsmedelskontroll och att identifiera möjligheter och / eller hinder för detta. Detta förväntas bidra med kunskap som på lång sikt kan generera tillsynsstrategier för minskat matsvinn.

En kvalitativ forskningsmetod användes med självadministrerade frågeformulär. Svar erhölls från 11 kommuner och sex ytterligare aktörer, såsom domstolar, nationella myndigheter samt en privat juristbyrå. Efter en tematisk analys av den insamlade datan sorterades denna för att beskriva 1) Den aktuella situationen i kommunal tillsyn / den aktuella tillämpningen av hänsynsreglerna enligt andra aktörer 2) Inställningen till att tillämpa miljöbalkens hänsynsregler i tillsyn för att förebygga matsvinn 3) Attityden gentemot föreslagna tillsynspraxis för att förebygga matsvinn.

Resultaten visade att majoriteten av de undersökta aktörerna inte tillämpade hänsynsreglerna på matsvinn för närvarande, och att ingen hade skrivit förelägganden för att förebygga matsvinn. Praktiska erfarenheter inom området samt majoriteten av respondenternas attityder avslöjade dock att det skulle kunna vara möjligt att tillämpa hänsynsreglerna mot matsvinn inom livsmedelskontroll. Inga uppenbart olösliga hinder identifierades. Hur tillämpningen av hänsynsreglerna på matsvinn skulle gå till i praktiken återstår dock att lösa. Följaktligen kunde det konstateras att kopplingen mellan den nuvarande situationen, respondenternas inställning till att tillämpa hänsynsreglerna i livsmedelskontrollen samt attityderna gentemot föreslagna tillsynspraxis var tvetydig. Juridiska motsättningar motiverar behovet av ytterligare forskning, som kan driva utvecklingen av en tillsynsstrategi för förebyggande av matsvinn.

Nyckelord: matsvinn, livsmedelskontroll, tillsyn, tillsynsmyndighet, livsmedelsinspektör, kvantifiering, livsmedelslagstiftning, allmänna hänsynsregler, miljöbalken

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Abbreviations

The abbreviations used in the current study are presented below. The Swedish translation is found in italics.

CAB	County Administrative Board *(Länsstyrelse)*
EPA	Swedish Environmental Protection Agency *(Naturvårdsverket)*
GDPR	The General Data Protection Regulation
GRC	General rules of consideration in the Swedish Environmental Code *(Allmänna hänsynsregler i miljöbalken)*
LEC	Land and Environment Court *(Mark- och miljödomstolen)*
LECA	Land and Environment Court of Appeal *(Mark- och miljööverdomstolen)*
NFA	Swedish National Food Agency *(Livsmedelsverket)*

1. Introduction

An estimated 1,3 billion tonnes of food is lost or wasted every year, representing one third of all food produced for human consumption globally (Gustavsson et al. 2011). As a result of a growing world population and an increased need for resource efficiency, global awareness of the issue has increased in recent years (FAO 2020a). Indeed, the 2030 Agenda for Sustainable Development recognizes food waste as a major problem and has set a target to halve per capita global food waste at the retail and consumer levels by 2030, and reduce losses along production and supply chains (FAO 2020b).

In Sweden, approximately 1,3 million tonnes of food waste are generated per year (Jonsson 2020). Unlike many other countries, landfilling is forbidden in Sweden (SFS 2001:512) and surplus food is usually used for biogas production or donated to charity (Eriksson et al. 2018a). Still, food waste represents a large part of the total environmental impact in Sweden. According to Jonsson (2020), the Swedish food management accounts for about 50 percent of the total domestic eutrophication and 20-25 percent of the country's overall climate impact. Additionally, food production contributes to the spread of toxins, such as pesticides, and is found among the most water-consuming sectors. Reducing unnecessary food production is therefore of great importance (Jonsson 2020).

Generally, reducing the waste in the later stages of the food supply chain leads to the greatest environmental and economic benefits (Loxbo 2011). At the consumer and distribution level, the most waste is generated in households (79%), followed by food stores (9%), restaurants (6%) and public catering services (6%) in Sweden (Andersson & Stålhandske 2020). However, since households serve a much greater volume of food, comparisons of absolute values give a limited picture of the issue according to Eriksson et al. (2018a). Actually, in relation to the mass of food served, it is even possible that the public or private catering sector has a similar level of food waste as households, researchers claim (Eriksson et al. 2018a). With knowledge of these figures, is it highly relevant to ask how food waste can be prevented.

One way of preventing food waste is through legislation. France became the first country in the world to establish a law to reduce food waste. Instead of throwing away edible food, large grocery stores are obliged to sign an agreement with non-profitable organisations that can redistribute their surplus food (Abellan Matamoros

2019). However, the law does not establish the quantity that has to be donated, so a supermarket donating only a small fraction of its food would still conform with the law (European Court of Auditors 2016). Sweden has chosen another path on this issue and refers to the action plan that has been developed by different authorities on the government's behalf (Livsmedelsverket et al. 2018). In addition, actors in the food industry deem that Sweden has gone further in the food waste issue and has had legislation similar to that in France for many years (Eriksson 2019), although it is not clear what legislation they mean. However, there is reason to believe that they refer to the Swedish Environmental Code since this regulates the use of natural resources in Sweden.

The Swedish Environmental Code (Swedish: *Miljöbalken*) contains a number of general rules of consideration (SFS 1998:808), which say that "Everybody conducting an operation or taking measures must conserve raw materials and energy and also utilise opportunities of reuse and recycling. In the first instance renewable sources of energy should be utilised" (Ministry of the Environment 2015). In fact, already in 2013 the Swedish National Food Agency produced a report for reducing food waste in municipalities, where inspectors were recommended to control that food operations work according to the general rules of consideration in the Environmental Code regarding food waste (Haglund 2013). However, there is a lack of published information on whether the Environmental Code is applied to reduce food waste at present, and, if so, how this works in practice.

Moreover, the lack of a common standard for food waste quantification is a problem recognized by researchers, who claim that this is the vital first step in waste reduction (Eriksson et al. 2017; Eriksson et al. 2018a). Additionally, suggestions on which categories should be recorded if e.g. all Swedish municipalities would quantify waste in the same way have not yet been presented (Eriksson et al. 2018a). This problem has received attention from Suhonjic (2017) who found that Swedish schools that quantify food waste have no benchmark to compare with and are therefore unaware of how they are performing in relation to other schools. Thus, in addition to clarifying the legal issues regarding food waste reduction and food control, an approach to food waste reduction including quantification and a benchmark is needed.

2. Aims and objectives

The aim of this study is to investigate whether and how the general rules of consideration (GRC) in the Swedish Environmental Code are or can be applied by relevant stakeholders to prevent food waste. The goal is to investigate the attitude of municipal supervisory authorities and other relevant actors towards applying the GRC in food control, and to identify opportunities and / or obstacles to this. The overall goal is to contribute with knowledge that in the long term can lead to supervisory approaches for reduced food waste.

2.1. Questions

- Are the GRC applied to food waste today?
- What opportunities / obstacles are there for applying the GRC in food control with the aim of preventing food waste?
- Would a supervisory authority be able to impose the following requirements on food operations:

    1. That all food operations must quantify their food waste

    2. That an operation that has a high proportion of food waste must reduce its waste so that it falls below a certain level?

3. Background

3.1. What is food wastage?

Food wastage occurs at all stages of the supply chain, including producing, processing, retailing and consuming. According to the Swedish National Food Agency (NFA), food waste refers to edible food that is thrown away (Haglund 2013). However, since food waste in municipal activities is often measured by quantifying plate waste and serving waste including both edible and inedible parts (Eriksson et al. 2018a), a broader definition of food waste is needed in this context. In the present study, the definition of food waste established by the EU project FUSIONS (2016) is therefore used, referring food waste to **"**any food, and inedible parts of food, removed from the food supply chain to be recovered or disposed **(**including composted, crops ploughed in/not harvested, anaerobic digestion, bio-energy production, co-generation, incineration, disposal to sewer, landfill or discarded to sea)". Figure 1 shows a theoretical framework of the resource flows in the agri-food system designed by FUSIONS (2016). Section A in the figure introduces the main steps from production to consumption, whereas section B presents different routes for all material that is not consumed. This section is further divided into "valorisation and conversion" (B-i) and "food waste" (B-ii). B-i refers to any food (or inedible parts of food) sent to animal feed, bio-material processing or other industrial uses while B-ii represents FUSIONS' proposal for the term food waste, defining the final destination of all edible and inedible parts of food removed from the food supply chain. Moreover, Section C covers the production of animal feed and section D refers to non-food uses of primary production resources. The arrows show how the resources flow between the processing steps (Östergren et al. 2014).

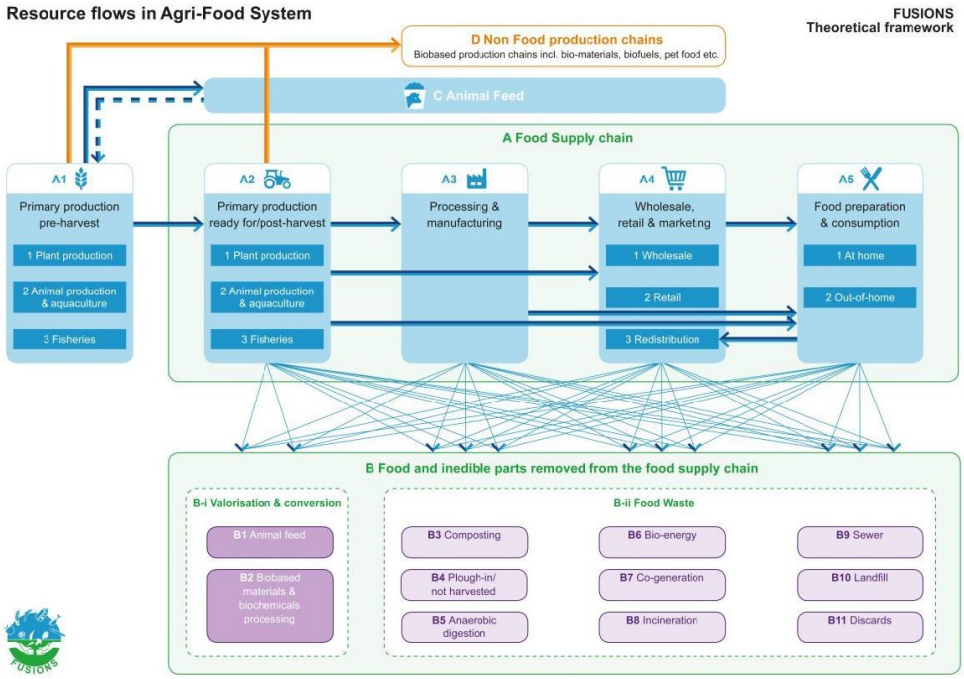

Figure 1. Resource flows in the agri-food system. Source: FUSIONS 2016

3.2. Causes of food waste and preventative measures

Food waste arises for a variety of reasons along the entire food supply chain. According to the Swedish Board of Agriculture (SBA) (Jordbruksverket 2020), the main causes for wastage in the primary production are premature animal death and drug treatment (animal products) as well as losses during harvest, quality changes during storage and sorting due to appearance or other defects (vegetables). In the food industry, wastage can occur due to damaged raw materials, change of product in a production line or production failure (Lindbom et al. 2013). Moreover, Jonsson (2020) points out past sell-by date as a common reason for food waste in food stores, which in turn can be caused by miscalculation, customer's irregular buying patterns, promotions etc. At the restaurant and public catering level, food waste occurs both when preparing and serving meals, as a result of e.g. too many prepared portions and self-service (Jonsson 2020).

The latest report from the Swedish Environmental Protection Agency (EPA) on food waste prevention measurements (Lagerberg Fogelberg 2014) states the following policy instruments for reduced food waste: "support to municipalities to establish advisory functions, communication efforts, clarification of national guides

and guidelines, studies that give the factual base for establishing more on-site kitchens in for example schools and hospitals, voluntary agreements that include commitments as well as support, changes to food pricing patterns, and the revision of existing and development of new regulations."

Furthermore, Swedish authorities and actors in the food system work together to reduce food waste through different missions. In 2010, the Collaboration Group for Reduced Food Waste, SaMMa, was established in Sweden (Naturvårdsverket 2013). SaMMa is an open forum for Swedish actors interested in food waste. The purpose of the collaboration group is to work to reduce food waste by providing a contact area for discussions and information on how food waste can be reduced (Jonsson 2020).

Moreover, in 2017, the government assigned the NFA together with the SBA and the EPA to continue the work towards reduced food waste (Jonsson 2020). The assignment extended over three years, and the first part consisted of the development of an action plan for reduced food waste (Livsmedelsverket et al. 2018). This aimed to show how Sweden should work with long-term measures in order to achieve the global sustainability goal 12.3 regarding food loss and food waste. So far, the action plan has resulted in e.g. the development of a national target for food waste (Naturvårdsverket 2020). The government's assignment to reduce food waste is part of the national Food Strategy, where authorities are urged to corporate to reduce food waste throughout the whole food chain (Jonsson 2020).

In 2020, the authorities have been given a new joint six-year government assignment, in order to continue the work towards reduced food waste (Naturvårdsverket 2020).

3.3. Food waste and legislation

3.3.1. Legislation in the EU and its member states

At European scale, the commitment to reduce food waste has been declared in the EU Action Plan for the Circular Economy (European Commission 2015), and in the Revised EU Waste Legislation amending the European Directive on waste (European Parliament and Council 2018). The latter calls on the member states to reduce food waste at every stage of the food supply chain, monitor food waste levels and report back on progress made. Some EU members have established national food waste prevention programmes, while others (France and Italy) have also adopted specific legislation to reduce the national food wastage (Brivio 2016).

As mentioned, the French legislation is coercive and imposes financial sanctions for large supermarkets in case of non-compliance. On the other hand, the Italian legislation does not use penalties, but incentives. The law allows businesses to donate food past its sell-by date and provides them with tax cuts proportional to the

amount of food they give away (Abellan Matamoros 2019). However, according to researchers, this policy solution does not tackle the core issue of surplus food prevention, which leaves room for questioning its effectiveness (Giovannini et al. 2020). Giovannini et al. (2020) suggest instead an integrated policy framework to tackle food waste particularly. For this, more empirical studies on how different food waste legislations interact is needed though, they conclude.

3.3.2. Swedish food legislation

In Sweden, most legislation concerning food is based on EU-legislation. The Swedish Food Act (SFS 2006:804) complements EU regulations and aims to ensure a high level of protection of human health and consumer interests regarding food. The law includes rules on public control, governmental fees, penalties and appeals. Additionally, the Swedish Food Regulation (SFS 2006:813) tells which authority should control different types of food facilities, among other things. It also gives the NFA the authorization to issue different kinds of regulations (Livsmedelsverket 2020b).

The current food legislation does not primarily concern food waste issues. However, e.g. labelling legislation affects indirectly food waste by allowing supermarkets and consumers to misjudge the best-before-date of products and thus throw away edible food (Jonsson 2020). Packaged foods (with a few exceptions such as fresh fruits, sugar and salt) must be labelled with the best-before-date or, in some cases, expiration date (Livsmedelsverket 2019).

Moreover, no specific legislation for food donations exists in Sweden at present. To redistribute food is equated with the sale of food, which means that the same law is applied to donations and sales (SFS 2006:804).

3.3.3. The Swedish Environmental Code against food waste

As mentioned previously, the Swedish Environmental Code (SFS 1998:808) can be applied to reduce food waste. The NFA points out several provisions that can be used in supervision for reduced food waste (Haglund 2013). These include the general rules of consideration in Chapter 2, that require knowledge (Section 2) as well as conservation of raw materials and energy (Section 5). Additionally, in accordance with the reasonableness rule in Section 7, a plausibility evaluation should be made where the benefits of the safeguard measures are set against the costs. Chapter 26 Section 19 on the operator's control and environmental report can be applied by the authority to impose requirements on the operator's knowledge of his or her activities and on the establishment of self-control programs.

Furthermore, businesses and activities generating waste are required to handle the waste in a health and environmentally acceptable manner, according to Chapter

15 Section 11 of the Environmental Code. The full text of the provisions (translated from Swedish) is found in Table 1.

Table 1. Chapters (Ch.) and Sections (Sec.) in the Swedish Environmental Code (SFS 1998:808) that can be used in supervision for reduced food waste.

Ch.	Sec.	Content
2	2	*"Persons who pursue an activity or take a measure, or intend to do so, must possess the knowledge that is necessary in view of the nature and scope of the activity or measure to protect human health and the environment against damage or detriment."* (DS 2000:61)
	5	*"Persons who pursue an activity or take a measure shall conserve raw materials and energy and reuse and recycle them wherever possible. Preference shall be given to renewable energy sources."* (DS 2000:61)
	7	*"The rules of consideration laid down in sections 2 to 6 shall be applicable where compliance cannot be deemed unreasonable. Particular importance shall be attached in this connection to the benefits of protective measures and other precautions in relation to their cost. The cost-benefit relationship shall also be taken into account in assessments relating to total defence activities or where a total defence measure is necessary. A decision reached in accordance with the first paragraph must not entail infringement of an environmental quality standard referred to in chapter 5."* (DS 2000:61)
26	19	*"Persons who pursue an activity or take a measure that is liable to cause detriment to human health or affect the environment shall continuously plan and monitor the activities in order to combat or prevent such effects. Persons who pursue such an activity or take such a measure shall also keep themselves informed, by carrying out investigations on their own initiative or by other means, about the impact on the environment of the activity or measure. At the request of the supervisory authority, a person who pursues such an activity shall submit proposals for control programmes or remedial measures to the authority. The Government or the authority appointed by the Government may issue rules concerning controls."* (DS 2000:61)
15	11	*Waste management should ensure that the handling does not damage or cause a risk of harm to human health or the environment. Special consideration should be taken* *1. the risk that the handling may pose for damage to water, air, soil, plants or animals;* *2. the inconvenience that the handling may entail through noise or odor; and* *3. the negative impact that the management can have on specially protected areas referred to in Chapter 7, on other areas of special importance to the environment or to the landscape in general.* *A provision stipulating that producers may be given an obligation to handle waste is in section 12. Provisions that municipalities have and can be given the obligation to handle waste can be found in sections 20 and 22. Law (2019: 1263). (*SFS 1998:808*)*

In case of doubt, Swedish legislation should be interpreted in the light of the EU Waste Framework Directive, 2008/98/EC (Haglund 2013), which shows the hierarchical order in which different methods should be used for waste management. With this directive as a basis, a specific food and drink material hierarchy has been developed to be more easily used by businesses in the food and drink sector (Figure 2). The hierarchy shows that the most preferable option is to prevent the occurrence of food waste in the first place. Food that is still left over is donated to needy people or alternatively used as feed, digested into biogas and so on. The alternatives at the top of the hierarchy are the most resource efficient and thus the best from an environmental point of view (WRAP 2020). According to the NFA, the food and drink material hierarchy provides guidance on how food waste can be reduced on a general level, yet it is not applicable to all activities and at all times (Livsmedelsverket 2020c).

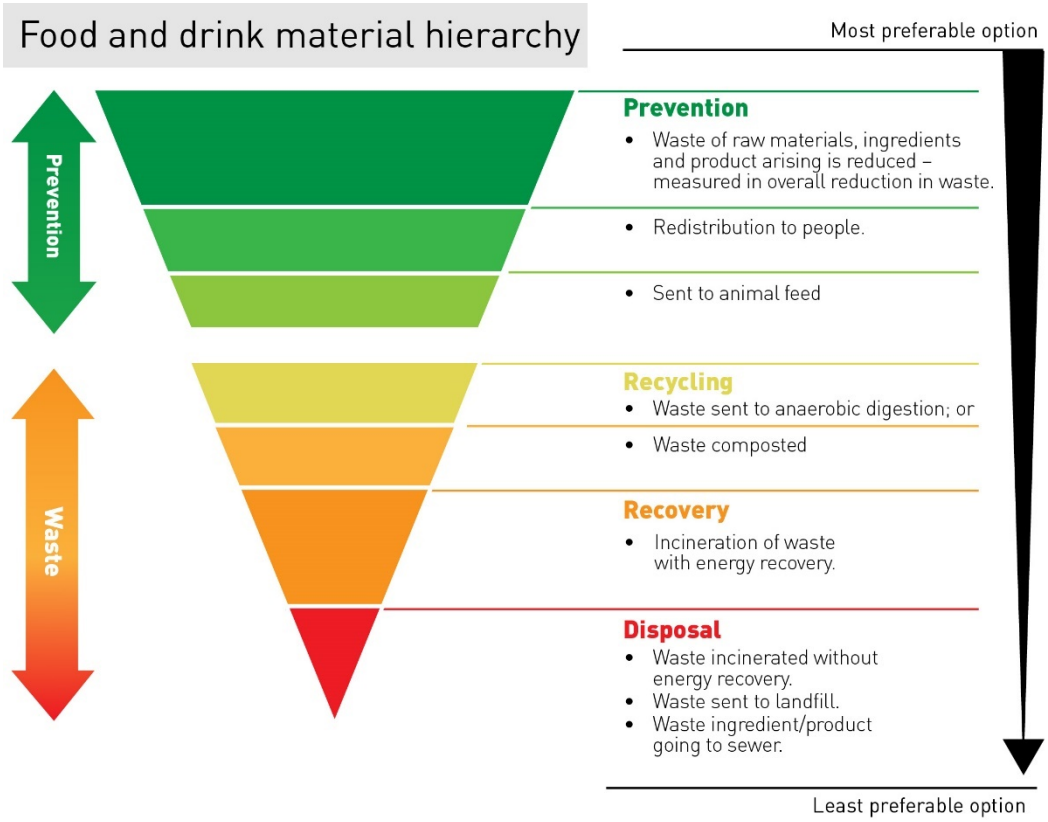

Figure 2. Waste hierarchy for food and drink businesses. Source. WRAP 2020

3.4. The Swedish model of government and the food system

In order to understand how the Swedish food system works and how food waste can be prevented, an insight into the country's governance is needed. The governance in Sweden is divided into three main levels: national, regional and local. In addition, the European level of government has acquired increasing importance since Sweden's entry into the European Union in 1995. Being a member of the EU means that Sweden influences and is directly affected by EU decisions (Government Offices of Sweden 2015).

The government *(regeringen)* is assisted in its work by the Government Offices *(regeringskansliet),* with several ministries *(departement),* as well as government agencies *(myndigheter)* and companies owned by the government. The government agencies (hereinafter also called authorities) are state-controlled organizations that ensure that policies of the parliament *(Riksdag)* and government are applied (Regeringskansliet 2019). Relevant authorities for this study are briefly described in the following paragraphs.

3.4.1. Swedish National Food Agency

The Swedish NFA *(Livsmedelsverket)*, is the central control authority and expert in the field of food in Sweden. The agency works for safe food and drinking water, healthy dietary habits and fair food trade practices (Livsmedelsverket 2020d). Additionally, environmental issues such as food choices and food waste are integrated into the NFA's mission. Furthermore, the agency has an active part in the development of new food legislation in cooperation with other EU member states (Livsmedelsverket 2020e).

The NFA's role in food control is described in more detail under section 3.5.2. on municipal food control administration.

3.4.2. Swedish Environmental Protection Agency

The Swedish EPA *(Naturvårdsverket)* is a government agency for environmental issues within Sweden, the EU and internationally. The agency works on behalf of the Swedish government and reports to the Ministry of the Environment (Regeringskansliet 2020). The responsibilities include collecting knowledge and documentation, developing as well as implementing environmental policy. More specifically, the agency shall work to ensure compliance with the Swedish Environmental Code and achievement of the national environmental goals, and if necessary, propose actions for the development of environmental work (Oscarsson 2019).

As already mentioned, the EPA cooperates with the NFA and the SBA to. reduce food waste nationally (Jonsson 2020). In addition, the EPA is responsible for submitting an annual report to the government on how supervision can be improved. The report also addresses possible deficiencies in supervision and explains how these can be addressed (Magnusson 2020).

3.4.3. Land and Environment Courts

The Land and Environment Court (LEC) *(Mark- och miljödomstolen)* is in Sweden a special court whose main tasks include handling cases in accordance with the regulations of the Swedish Environmental Code (Wikipedia 2020). There are currently five LECs, which are part of the following district courts (*tingsrätter*) in Sweden: Umeå, Östersund, Nacka, Växjö and Vänersborg (Sveriges Domstolar 2019).

District courts are courts of first instance, with usually the lowest level of the hierarchy (Wikipedia 2019a). The Land and Environment Court's decisions may be appealed to the Land and Environment Court of Appeal (LECA) (*Mark- och miljööverdomstolen*), which is a second instance court and part of the Svea Court of Appeal *(Svea hovrätt).* As a rule, the LEC's judgments and decisions in cases that have been appealed to the LECA may not be further appealed. A case at the LEC is initiated by an application for a lawsuit, an application to the court or by appeal of a decision issued by an administrative authority or municipality (Wikipedia 2020).

3.4.4. County Administrative Boards

A County Administrative Board (CAB) *(länsstyrelse)* exists in every county and is led by a county governor *(landshövding)* who represents the government in the county. The CAB has many tasks, that range from being an electoral authority to coordinating regional emergency preparedness. It's work also includes food inspections as well as environmental and public health (Länsstyrelsen Stockholm 2020a). The CAB provides the municipalities with supervision guidance. This involves providing support and advice, coordinating, following up as well as evaluating municipal supervision (Länsstyrelsen Stockholm 2020b).

The CAB is also responsible for compiling the municipal waste plans to the Swedish Environmental Protection Agency (EPA). In addition, the CAB pursues the issue of food waste through e.g. seminars (Bjurhall 2020), counselling (Johansson 2020) and environmental councils (Miljö- och klimatrådet Västmanland 2020).

3.5. The Swedish local self-government

To understand how food control is conducted in Sweden and its possible role in preventing food waste, the following paragraphs provide information about the so-called local self-government, the organization of Swedish municipalities, the municipal food control administration as well as municipal waste management.

The regional and local government in Sweden is often referred to as local self-government. Swedish regions and municipalities have a long tradition of a significant degree of independence, and the principle of local self-government is enshrined in the Swedish constitution (Regeringskansliet 2005).

Local self-government at local and regional level is practiced, respectively, by municipalities and county councils, which are responsible for providing a substantial proportion of the public services in Sweden (SKR 2020). Sweden consists of 21 counties and 290 municipalities (SKR 2019a). The relation between municipalities and counties is not hierarchical, since all have their own self-governing local authorities which are responsible for different services (SKR 2020).

While the regions' main responsibilities include health care and public transport, the municipalities are responsible for preschools, schools, social services and elderly care (SKR 2019a). These organisations represent a large part of the public catering in Sweden (Eriksson et al. 2017). In addition, the fact that municipalities also conduct supervision of public and private food operations (Solna stad 2020) makes municipalities interesting for the current study.

3.5.1. How are Swedish municipalities organized?

In international comparison, Swedish municipalities are geographically large and generally include both urban and rural areas (Wikipedia 2019b). The population in the municipalities varies between a few thousand and nearly one million (SCB 2020).

Swedish municipalities are governed by politicians elected by citizens at municipal elections. The Municipal Council (*kommunfullmäktige*) is the main decision-making body of the municipality. The council in turn appoints a Municipal Executive Board (*kommunstyrelse*), which manages and coordinates municipality work (Government Offices of Sweden 2015). All municipalities must have a municipal executive board, but it is up to each municipality to decide how the rest of the municipal organization should be (Ahlberg, & de Vries 2019).

The municipal council decides which committees *(nämnder)* should exist in the municipality and elects members to these. Each committee is responsible for a specific area. Examples of committees found in many Swedish municipalities are the Environment Committee and the Social Welfare Committee. All questions that come to the council are prepared in one of the committees. On minor issues, the committees can decide directly (SKR 2019b).

The activities of municipalities, county councils and regions are governed by the Swedish Local Government Act. Municipalities are also governed by other laws such as the Social Services Act and the Education Act. The municipalities must follow the frameworks that the parliament and the government determine, but beyond this, the municipal self-government gives the municipalities the right to make independent decisions and collect taxes from the inhabitants in order to carry out their duties (SKR 2019b).

Furthermore, the municipalities are responsible for internal control. Food control and environmental supervision are included in municipal supervision (Riksrevisionen 2018). The practical application of food control and environmental supervision is explained below.

3.5.2. Municipal food control administration

The aim of public control in the food supply chain is to protect human and animal health and protect the interests of consumers. This includes that consumers should be able to rely on labelling and information about the food (Livsmedelsverket 2020f). The responsibility for food control in Sweden is shared between municipalities, CABs and the NFA as follows:

The municipalities control for example food stores, restaurants, school kitchens and organizations, summing up to a total of about 65 000 companies and organizations. The CABs, on the other hand, are in charge of the control of primary producers such as individual farmers, breeders, fishermen and berry pickers (Livsmedelsverket 2020g). The municipalities' decisions can be reviewed by the CAB, and the CABs also check that the municipalities' control complies with the legislation (Livsmedelsverket 2020f). Finally, the NFA is the leader and coordinator of the Swedish food control. In addition, the agency itself controls for example egg packers, larger dairies and fish farms, and has constant supervision of all slaughterhouses. In order to make the food control equal across the country, the NFA reviews the municipalities' food control. The agency also checks that CABs follow the food legislation. Furthermore, the EU checks that the member states' food control complies with common EU law. This is done through the Food and Veterinary Office in Dublin, Ireland (Livsmedelsverket 2020g). A description on instructions as well as goals and priorities for food control is found in the National Control Plan, which has been developed jointly by government agencies such as the NFA, SBA and the CABs (Livsmedelsverket 2020f).

Owing to the local self-government, the municipalities are independent authorities who plan their own activities, including food control. Environment and Public Health Committees *(miljö- och hälsoskyddsnämnder)* or similar committees carry out food control in municipalities (Livsmedelsverket 2020h). The Environment and Public Health Committee is responsible for the Environment Department *(miljöförvaltningen)*, which has supervision and monitoring as its main

tasks (Stockholms stad 2019). The organization can vary within municipalities depending on e.g. their different sizes.

Usually, supervision is carried out by an environmental and health inspector (*miljö- och hälsoskyddsinspektör*), and includes keeping track of noise problems, food hygiene and pollution etc. through inspections, sampling, measurements and investigations. At larger environmental offices, the inspector role is often divided into several areas, such as environmental inspector and food inspector, where the latter solely work with food hygiene controls at e.g. restaurants and food stores (Saco 2020). On the other hand, in smaller municipalities (>1/3 of all Sweden's municipalities), the inspectors have larger areas of responsibility that require a broader base of expertise. At the national level, it is therefore not uncommon for the same inspector to perform both environmental supervision and food inspection (Edlund 2015).

The environmental inspection and food inspection are regulated by the Environmental Code and the Food Act, respectively. A large part of the environmental supervision is directed to so-called environmentally hazardous activities (regulated in SFS 1998:899). Additionally, other plants handling chemicals as well as waste management are also controlled by environmental inspectors. On the other hand, food supervision is carried out at operators that handle food, and includes hygiene and routine checks (Järfälla kommun 2019). A food operator is defined as any private or public business, that produces, processes or distributes food (European Parliament and Council 2002).

According to the EU regulation 2017/625, public food control must be risk-based. It should be carried out regularly and at a frequency proportional to the risks in the operation being controlled. Among other things, account must be taken of known risks associated with goods and operations, the likelihood of consumers being misled and the results of previous controls (European Parliament and Council 2017).

The main components of the public food control are audits of the operators' self-monitoring system, inspection in the facility and possible sampling (Livsmedelsverket 2020i). An audit is always reported in advance, while an inspection is often unannounced with the aim of giving a concrete picture of how the business functions and is conducted. Sampling can be done as a complement to inspections and audits (Livsmedelsverket 2020j).

In Sweden, food control is financed by the food businesses, through so-called control fees to the supervisory authority. The amount of the fee depends on how long it takes to control the business (including preparation, implementation and post-work) as well as the hourly rate set by the municipality (Livsmedelsverket 2020i).

If the supervisory authority notes deficiencies, these are followed up by action plans, follow-up inspections or other measures. Stricter measures such as

prohibitions or injunctions may, for example, be about prohibiting the sale of incorrectly labelled foods. The supervisory authority is also obliged to make a prosecution report when the food operator has not complied with the food legislation. If there is a risk to human health, the authority can close the business. In the above cases, the food operator should pay a fee for extra public control (Hässleholms kommun 2019).

A decision, such as an injunction or prohibition, can be appealed by the food operator. An appeal is tried by the higher instance and then by the upper instance. When a municipality decides on an appeal, the business can appeal to the CAB. The CAB's decision can be appealed to the Administrative Court (*förvaltningsrätten*). Thereafter, the Administrative Court's judgment can be appealed to the administrative court of appeal (*Kammarrätten*) (Livsmedelsverket 2020j).

3.5.3. Municipal waste management

In Sweden, municipalities have a monopoly on household waste and household-like waste (Eriksson et al. 2018a). This means that each municipality is responsible for the collection, transport and recycling or disposal of such waste generated in the municipality. The term household waste is defined by the Environmental Code as waste that comes from households and thus comparable waste from other activities, such as restaurants and offices (Avfall Sverige 2019a).

All municipalities must have a valid waste and sanitation ordinance adopted by the municipal council. This consists of a waste plan and regulations for waste management. Municipalities are free to collaborate and develop common regional waste plans (Avfall Sverige 2019a). According to Avfall Sverige (2019a), collaboration between municipalities has shown to provide the greatest possible environmental and social benefit, effective management of waste cost and an assurance that necessary skills are in place.

Municipal waste management is fee funded. In order to be able to cover the municipality's entire cost for waste management, a waste tariff must be established with fees for the services that are included in the municipal waste responsibility. This is paid by the individual households and businesses (Avfall Sverige 2019 b).

Responsibilities beyond municipalities include producer responsibility, household responsibility and business responsibility, where the latter includes non-household waste and waste that is not covered by producer responsibility (Avfall Sverige 2019a).

3.6. Food waste quantification

Finally, this last background section summarizes relevant information available on food waste quantification.

From 2020, all member states must report to the EU the amount of food waste generated. Currently, Swedish food waste statistics are compiled every two years in connection with the production of the national waste statistics. The statistics comprise the quantities of food waste generated in Sweden two years before publication (Anderzén 2020). In these statistics food waste includes both unavoidable food waste (such as peels, bones and coffee grounds) and avoidable food waste, i.e. food that could have been eaten if handled differently. The Swedish food waste statistics has been produced using existing data sources such as data from treatment plants of collected food waste, municipal waste management register and environmental reports from food manufacturers (Andersson & Stålhandske 2020).

Figure 3 shows how the generated food waste is distributed among the different stages in the food supply chain.

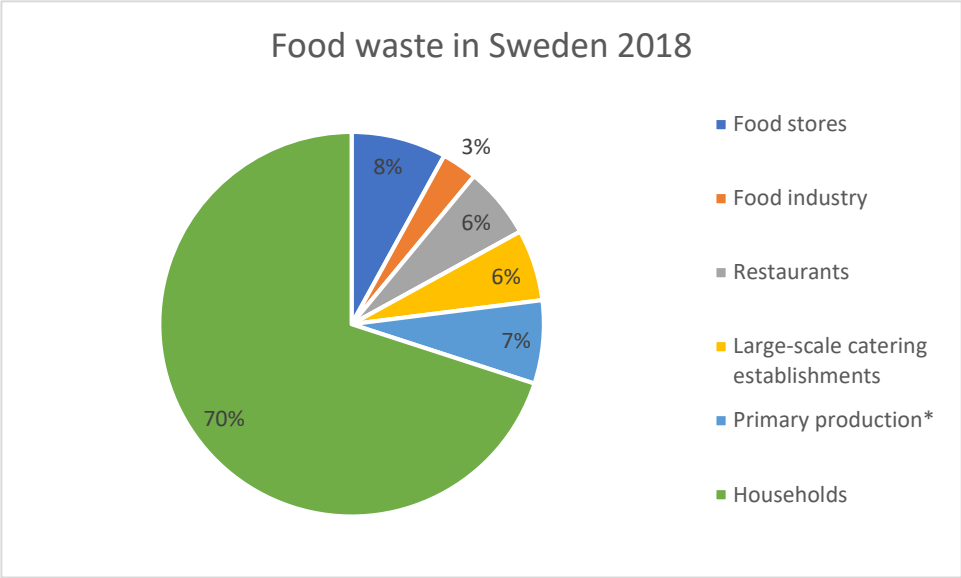

*Figure 3. Generated food waste in Sweden 2018, shown on the various sectors of the food supply chain. No data available for wholesale, warehouses and e-commerce. *Last update is from 2014 (Andersson & Stålhandske 2020)*

As can be seen in the report from 2018's food wastage (Andersson & Stålhandske 2020), EPA collects aggregated data for the total amount of food waste in each stage and does not provide detailed figures from each individual unit.

According to Eriksson et al. (2018a), in recent years many Swedish municipalities have started to quantify their food waste. However, as there is a lack of a common standard for quantifying and reporting food waste, the comparison between municipalities and different organisations becomes difficult (Eriksson et al. 2017). Moreover, the results of the quantifications are often reported through different webpages or newspaper articles, which makes it difficult to get a complete idea of how the sector is progressing (Eriksson et al. 2018a).

To date, little research has been done in the field, and researchers agree that there is a need to establish a benchmark for food waste (Eriksson et al. 2018a). In one of the larger case studies done on food waste quantification, the total food waste was amounted to 75 g per portion (23%) in a Swedish municipality. Researchers also found that the waste was unevenly distributed among kitchens, and that the type of guests served (schoolchildren, preschoolers or people at elderly care homes) affected waste levels significantly. Thus, an exchange of experiences between kitchens should be able to reduce the amount of waste if those with the highest losses can reach the same level as those with the lowest losses, researchers suggested.

4. Materials and methods

4.1. Study design

This project was designed as a two-step qualitative research study as described by Bryman (2016). In order to investigate the attitude towards applying the rules of consideration (GRC) of the Environmental Code in food control for reduced food waste, self-administered questionnaires were conducted to experts in the field.

4.2. Sampling

Relevant authorities were selected based on their work on food waste and / or the Environmental Code according to information on their websites. The majority of the authorities contacted were municipalities as these both conduct and supervise public catering and control other activities where food waste occurs. In the pilot study, nearby municipalities in the Stockholm region were contacted to enable personal interviews if needed. As answers were received, the decision was taken to conduct email interviews with self-administered questionnaires instead. Thus, more actors from other parts of the country were contacted. To get a more balanced sampling, the municipalities chosen were of different sizes and geographically dispersed. In order to increase the generalisability of the study, additional authorities and a private law firm were also contacted.

4.3. Questionnaires

The questionnaires were developed based on the research questions as recommended by Bryman (2016) and consisted of open-ended questions and a close-ended follow up question. To avoid common pitfalls in formulating the questions such as misunderstandings (Bryman 2016), a pilot study was conducted including five municipalities. The survey questions were then clarified according to questions from the respondents, whereupon the final questionnaire (Appendix 2) was sent to additional municipalities. In order to make answering easier to

respondents and to facilitate any discussion about the questions, the survey questions were sent to the authorities as regular emails, with a brief presentation of the study as an introduction. The questionnaires for the non-municipal actors differed somewhat from the questions to the municipalities (Appendix 3), as their relation to supervision differs from one another. Moreover, a follow-up question was sent to all respondents and was the same for everyone (Appendix 4).

4.4. Data collection

E-mails with survey questions (Appendix 2) were sent to 14 municipalities in eight counties. Additionally, questions (Appendix 3) were e-mailed to 10 non-municipal actors including three County Administrative Boards (CAB), one Land and Environment Court (LEC), the Land and Environment Court of Appeal (LECA), the National Food Agency (NFA), the Swedish Environmental Protection Agency (EPA), the Ministry of the Environment as well as a private environmental law firm with expertise in the Food Act as well as the Environmental Code. E-mails were sent between February 3rd and March 3rd 2020 to the authorities general e-mail addresses. The follow up question (Appendix 4) was sent between March 27th and 30th.

A total of 17 responses were received from the 24 actors contacted. Details of the respondents, such as which authority or company they represent, their position and the department which they belong to are found in Table 2.

Table 2. Obtained answers to questionnaires in Appendices (App.) 1-3.

Government Agency / business	**Position / department (translated from Swedish)**	**Position / department (in Swedish)**	**№ of answers**	**QNR**
Municipality	Environmental and/or health inspector / Environment Department etc.	Miljö- och/eller hälsoskyddsinspektör / Miljöförvaltningen e. dyl.	6	App. 1
			5	App. 3
Municipality	Management lawyer / Environment Department	Förvaltningsjurist / Miljöförvaltningen	1	App. 1
			1	App. 3
Municipality	Food inspector / Civil Administration	Livsmedelsinspektör / Samhällsbyggnadskontoret	1	App. 1
			1	App. 3
Municipality	Acting Environmental manager and food inspector / Civil Administration	Tf miljöchef och livsmedelsinspektör / Samhällsbyggnadsförvaltningen	1	App. 1
			1	App. 3
Municipality	Acting Environmental and health manager / Urban Construction Administration	Tf miljö- och hälsoskyddschef / Stadsbyggnadsförvaltningen	1	App. 1
			1	App. 3
Municipality	Head of environmental protection supervision and environmental monitoring / Environmental and building Administration	Enhetschef miljöskyddstillsyn och miljöövervakning / Miljö- och byggnadsförvaltningen	1	App. 1
			1	App. 3
Environmental Law firm	Environmental lawyer	Miljöjurist	1	App. 2
			1	App. 3
CAB	Environmental officer / Department of Environmental Supervision	Miljöhandläggare / Miljötillsynsenheten	1	App. 2
			1	App. 3
LECA	Judge of appeal	Hovrättsråd	1	App. 2
			1	App. 3
NFA	Project leader for the government assignment for reduced food waste	Projektledare regeringsuppdraget för minskat matsvinn	1	App. 2
			1	App. 3
EPA	Advisor / Department of Sustainability	Rådgivare / Hållbarhetsenheten	1	App. 2
			1	App. 3
LEC	Judge (of a district court)	Rådman	1	App. 2
			1	App. 3

4.5. Data analysis

The answers from the municipalities and the other authorities were analysed separately, due to different relations to supervision. All answers related to the questions were counted, including answers that referred to another authority or documents.

The data was analysed using thematic analysis as described by Bryman (2016). After a thorough overview of the collected data, the themes were determined to describe 1) The current situation in municipal supervision / the current application of the GRC according to other actors 2) The attitude towards applying the GRC in supervision for food waste reduction 3) The attitude towards suggested supervisory practices for reducing food waste. Moreover, "opportunities" and "obstacles" were chosen as sub-themes in order to group answers regarding the attitude towards applying the GRC in food control.

The data was coded by looking for repetitions, similarities and differences between answers as well as missing data, as recommended by Bryman (2016). The selected coding categories for the themes are found in Appendix 5.

4.6. Ethical aspects

Student work at undergraduate or graduate level is not covered by the Act concerning the Ethical Review of Research Involving Humans (SFS 2003:460). Thus, no application for ethical review was needed for this study. However, there are legal obligations e.g. when handling personal data, such as information on a person's name or opinions (Codex 2020). In accordance with The General Data Protection Regulation (GDPR), all participants were informed about the overall study purpose and information on the participants was handled confidentially (Datainspektionen 2020). Moreover, all respondents were informed that no names of persons would be published in the study. To increase anonymity further, no names of municipalities were mentioned, but only the positions that participated in the study.

5. Results

To distinguish between the different groups and their relation to supervision, the responses from the municipalities are presented first, followed by the responses from the other actors. This chapter presents the results as follows: 1) the current situation regarding food control and the application of the general rules of consideration (GRC) in the Environmental Code 2) identified opportunities and obstacles to the application of the GRC in supervision for food waste reduction 3) the attitude towards suggested supervisory practices for reducing food waste.

5.1. Municipalities

5.1.1. The current situation in municipal supervision

The municipalities responded that the GRC apply to different types of waste, often related to environmentally hazardous activities. One municipality responded that they are generally applied where it is considered relevant. Five out of 11 municipalities responded that the GRC mainly apply to environmentally hazardous activities (described in SFS 1998:899), and since food waste does not fall under this definition, the GRC are not applied to reduce food waste. One of these claimed that it is not possible and the rest (4/5) indicated that it is not prioritized.

Regarding the application of the GRC to food items, three out of 11 municipalities responded that they are currently applied to food items. These municipalities explained that 1) the municipality's meal service works with reducing the food waste in municipal services, but that food waste reduction control is not included in supervision as the municipality has so far not seen a need for it 2) a project where food waste at food operations is controlled according to the GRC and waste legislation was carried out by the municipality. However, these types of controls are not fee-financed since they are not part of the food legislation, which means that municipalities need resources in terms of finances and manpower to carry out such controls, they explained. The third municipality said that the GRC are applied in supervision but that no injunctions had been issued. Correspondingly, none of the 11 municipalities answered that injunctions were used to prevent food waste.

Eight out of 11 municipalities answered that the GRC in the Environmental Code are not applied to food items. Two of these said that they are applied to facilities for food production, such as slaughterhouses and dairies, but that these cases mostly deal with emissions, chemicals, disease control etc. rather than food waste. Several of the municipalities (5/8) stated the legislation as a cause for not applying the GRC to food items and explained that there is no link between the food legislation and the Environmental Code. Restaurants and food stores are controlled based on the food legislation, while environmentally hazardous activities are controlled based on the Environmental Code. Moreover, 3/8 municipalities said that the application of the GRC to food items was not a priority, and one half (4/8) referred to other municipal projects for reduced food waste including quantification and supervision of waste sorting as well as advice to food operations.

In summary, a majority (8/11) responded that the GRC in the Environmental Code were currently not applied to food items, and none (0/11) of the municipalities used injunctions for food waste.

5.1.2. Attitude towards applying the rules of consideration in municipal supervision for food waste reduction

Five of the surveyed municipalities thought that it would be possible to apply the GRC in supervision, while two municipalities answered that it would not be applicable. Furthermore, four municipalities answered "maybe" by explaining that the issue has not been investigated yet or by referring to another department in the municipality.

Those municipalities who responded that it would be possible to apply the GRC in supervision to reduce food waste argued that the Environmental Code applies to all types of activities where waste is generated. The municipality that had conducted a project for food waste reduction at food operators showed that this could be done by applying the GRC. One municipality mentioned that a prerequisite for the application of the rules in supervision is that it should be possible to collect food waste within the municipality (which was the case in the municipality in question). Two of the municipalities said that they lack a plan for a practical application of the GRC in supervision within the area of food waste. Nevertheless, they referred to e.g. the food waste legislation in France and the global Sustainable Development Goals for halved food waste by 2030, indicating that since such laws / goals exist, it should be possible to reduce food waste by applying the legislation. Another municipality said that many operators today use food waste as feed, and suggested that this could become a requirement.

The arguments against the application of the GRC in food waste supervision were mainly 1) there are other incentives (primarily economic ones) to reduce food waste (3/11) 2) other approaches to food waste reduction, which makes supervision unnecessary in this area (5/11) 3) legal issues that make the application of the rules

difficult in practice (3/11). The respondents that came up with these arguments gave some different explanations. The other approaches for food waste reduction included the municipalities' meal service (or similar) that worked with food waste reduction (2/5) and regular or project-related advice for food waste reduction from the municipality to food operators (3/5). Moreover, one municipality suggested that good environmental work and nudging methods for those who are good at reducing their food waste would result in the best success. The legal issues included the evaluation of whether they can be applied in the individual case. According to two of the municipalities, this should also consider the requirements of the food legislation. Since the food legislation makes strict demands on food safety and thus determines what can be sold and what must be disposed of, it is not compatible with the objectives of the waste legislation in this regard, one municipality argued. Additionally, some municipalities (2/4) explained that in addition to the GRC, other regulations are probably needed to be able to apply this in practice. One municipality referred to the need for a regulation that specifies the levels of food waste that should apply. Furthermore, the classification of waste was a problem that was raised by two municipalities. One of these explained that there is a discussion about whether food waste should be classified as household waste or business waste. The other one said that food waste is probably classified as household waste, which means that there is a municipal monopoly on it, which in turn makes it doubtful whether it is legally possible to make an injunction on it. Finally, other identified obstacles were the lack of financial resources in the municipalities.

To sum up, the responses from the municipalities were quite different regarding the application of the GRC in food waste supervision, as were the arguments for this. Even though a slight majority responded that it would be possible to apply the GRC in food waste supervision, the identified obstacles to this were more than the identified opportunities.

5.1.3. Attitude towards suggested supervisory practices for reducing food waste

Regarding the proposed requirement that all food operations must quantify their food waste, 4/10 municipalities said that a supervisory authority would be able to impose such requirement while as many respondents said that they did not know. Moreover, the remaining two municipalities said that they did not think that this would be possible. Those answering ”yes” commented that it is theoretically possible or that it should be possible as long as it is legally correct. Another municipality said that it should be possible, referring to the GRC (Section 5) and the fourth one said that it would be possible since waste quantification and reporting is required of other operations. However, one of them also said that at present, it would not be motivated with regard to resources (in terms of staff and finance) for everyone to quantify their food waste.

Those municipalities that indicated that they did not know gave different explanations. One municipality said that they had no plans to impose such requirements and doubted if there would be any legal support to it. Another one said that food waste supervision had not been prioritized in their municipality so far, but suggested that the proposed approach could possibly be used in the future to see how the operations follow the goals of reducing the amount of waste. They also believed that the priorities for supervision and work on waste issues would change in the future, and said that they hoped that the government agencies would provide clear information and guidance for the supervisory work. Additionally, one respondent said that Section 5 of the GRC could be used theoretically, but that the reasonableness rule could make it problematic. The respondent questioned if measuring really is the best way to reduce food waste, because if not, it would not be considered reasonable. Furthermore, the fourth municipality said that food operations are currently not classified according to the Environmental Code, but that the environmental inspectors could ask them questions about environmental issues too with hourly rate. But there is a long way to go from this to annual checks and requirements for food waste reduction, they predicted.

Finally, the municipalities that did not think that it would be possible to require food waste quantification of operations, said that 1) there seems to be no legal support to this (if the purpose is to only find out how much food waste is generated) and 2) a supervisory authority cannot require that *all* operations should quantify their food waste, as the requirements must always be addressed to a specific operation and be justified for that particular operation.

The suggestion to demand reduction of food waste in cases of high quantities received 3/10 answers related to "yes" and "no" respectively, whereas 4/10 indicated that they did not know. In addition to the comments above from those answering "do not know", one municipality explained that if an injunction is made according to the Environmental Code on a requirement that is too specific and does not have support in general advice, regulations etc., these decisions are often referred back from higher instances such as the CAB. Additionally, it is difficult to know what a reasonable level of food waste would be, they argued. They suggested that one approach for this could be to use an injunction to the food operator to investigate how much they can reduce their food waste and at what cost. The result would then be given to the supervisory authority who would establish it if they agree. It would be fun to try, but it requires that you have the policy with you, the municipality concluded.

One of the municipalities that answered that it would be possible to require that food operations would quantify their food waste, said that there is legal support to such requirement. The other two municipalities said that it should be possible to require a reduction, but demanding an exact amount of reduction could be problematic due to 1) the absence of a statutory limit value 2) the amount of

reduction should be related to the type and amount of food sold as this varies widely. One municipality said also that it would not be possible to follow up all food operators, but that it would definitely be reasonable to focus on those having the largest amounts of food waste.

Furthermore, two of the municipalities who answered “no” explained that no statutory level for food waste exists currently, and that it would be difficult to determine such a level. This is because it would be almost impossible to predict an optimal food handling for a specific operation, one respondent clarified. The third one referred to the food legislation and argued that this contains requirements that do not take into account environmental policy objectives.

When looking at the overall result, it appeared that the four municipalities answering “do not know” where the same in both questions, while those who answered yes to one question did not necessarily answer yes to the next question and vice versa.

To summarize, the majority of the respondents (4/10 respectively) either thought that it would be possible to require food waste quantification from food operations or indicated that they did not know, while 2/10 said that they did not think that it would not be possible. The question of requirements for reducing food waste was relatively evenly divided between "yes" (3/10), "no" (3/10) and "do not know" (4/10). The overall result showed that there was some variation between the respondents who answered yes and no, respectively.

5.2. Other actors

5.2.1. The current application of the rules of consideration

The question of the current application of the GRC gave widely different answers from the non-municipal actors. This was the only question (out of three) answered by the LECA (Land and Environment Court of Appeal), who referred to comments in the legislative history and informed that food waste was not found in these. However, the comments included waste in general (such as reducing the amount of waste and the amount of harmful substances) and recycling. Consequently, the LECA said that they were not able to make assessments in advance on cases that have not yet been tried in court. Similarly, the LEC (Land and Environment Court) replied that to their knowledge there is no practice on how the GRC are applied at consumer level or e.g. restaurant level regarding food waste. They added that there may be practices regarding the management of food waste in the waste industry and in industrial food production, but this was not developed further.

Furthermore, the lawyer at the private Environmental Law firm narrowed the question to food waste and said that the GRC were not applied at all in this regard. Moreover, the NFA (National Food Agency) referred to the EPA (Environmental

Protection Agency), which in turn referred to the National waste plan and waste prevention program (Naturvårdsverket 2018). The document describes the targets, instruments and measures introduced in Sweden for preventing waste and achieving a more resource-efficient and non-toxic waste management. It provides an overview of the legislation, including the GRC in the Environmental Code, and points out the following priority areas: food, textiles, electronics as well as construction and demolition. Regarding food waste prevention, the document refers to the following actions: the EU Action Plan, Nordic Council of Ministers' food waste project and the national food strategy developed by the Parliament.

Finally, the CAB (County Administrative Board) did not specify how the GRC were applied currently, but said that they, among other regulations, had formed the basis for a supervision project focusing on waste prevention that also included food waste.

In conclusion, 1/6 of the non-municipal actors said that the GRC had been used in supervision for food waste reduction (in a project), while the rest indicated that the GRC are not applied on food waste (although they left open that it might have happened).

5.2.2. Attitude towards applying the rules of consideration in supervision for food waste reduction

Both the LECA and the LEC said that since they did not know any practices in the field, they could not say with certainty what is possible for the supervision. In contrast, the lawyer at the law firm said that it would be fully possible to apply the GRC in supervision. Correspondingly, the CAB also said that this is totally possible and referred to a supervision project they had carried out together with 33 municipalities for waste prevention. Furthermore, the document which the EPA referred to did not answer this question.

The lawyer at the law firm said that since both food producers, restaurants etc. are operators according to the Environmental Code, it is completely possible to apply the GRC in the supervision of these. This could be done through supervision by environmental protection administrators. They could start by requiring investigations and that food businesses should report measures taken to reduce food waste, prior to issuing injunctions, the lawyer suggested.

The supervision project that was carried out by a CAB and 33 municipalities clarified how more circular work can be achieved in the different businesses through supervision, according to the respondent. Initially, the project was intended to focus on food waste in the food industry, but it was widened when they found that the legislation and requirements were reasonable for many more businesses, the CAB explained. Moreover, they shared the project's material for inspiration as well as a checklist that was used to check how the businesses work with waste prevention. However, the documents did not include any follow up of the project.

Furthermore, the document from the EPA (Naturvårdsverket 2018) indicated that there were both opportunities and obstacles to the application of the GRC in food waste supervision. It stated that the GRC in Chapter 2 describes what may be required of a business operator, and that specific requirements for waste minimization and management of business waste are often established upon trials. Additionally, the document emphasized the need for food waste quantification in order to follow up the work on preventing food waste and explained that several projects are in progress to improve this. Yet, the document referred to different national and international operations, rather than investigating whether food waste can be prevented through e.g. municipal supervision.

Finally, the LEC argued that a problem with injunctions would be to specify what should be done. An injunction should be clear enough so that the individual knows what should be done to not violate it. This raised the question "how should food waste be measured or quantified?" Also, the respondent considered it doubtful to make an injunction to e.g. a restaurant to reduce food waste solely for the purpose of prevention. This would probably require that the supervisory authority has evidence of that the restaurant regularly throws away "abnormally large amounts of food", which in turn is difficult to define. There are significant difficulties for the supervisory authority to tackle the issue of food waste, the LEC concluded.

To summarize, half (3/6) of the non-municipal actors did not answer the question of whether it would be possible to apply the GRC in supervision, while two said that it would be possible and one was unsure about it. Three arguments related to opportunities and three arguments associated with obstacles were found among the answers.

5.2.3. Attitude towards suggested supervisory practices for reducing food waste

Of the non-municipal actors, the lawyer and the CAB said that it would be possible to require food waste quantification from food operations, while the LEC and the NFA said that it would not and the EPA and LECA said that they did not know. The lawyer at the environmental law firm said that it would be possible owing to the requirements for self-monitoring, and the CAB explained that it would especially be reasonable to make such demands on larger operators (those subject to a permit and reporting obligation). Food waste quantification already forms a part of many operators' waste accounting, the CAB continued.

The LEC said that it is not possible to impose such a requirement on all food operators, since a supervision decision should be based on an assessment in an individual case. According to the LEC, this type of requirement would require general regulations, i.e. decisions in the form of a law, regulation or (if there are delegation provisions) government regulations. The NFA said that they believe in voluntary and self-responsibility in this issue, and supposed that it should be in the

interests of the operators to quantify their food waste since it deals with their economy.

Furthermore, the respondent from the EPA said that they did not work with supervision issues and therefore did not know which requirements could be imposed on food operators. Like before, the LECA answered that as a court they are not able to comment on the framework within which a supervisory authority can work, unless it appears in individual cases where it is necessary to judge.

The suggestion to require a reduction of food waste from operations generating a lot of food waste received no support from the non-municipal actors. The lawyer, LEC and NFA answered "no" to this, while the LECA, EPA and CAB indicated that they did not know.

The lawyer said that it might not be possible to require a food waste reduction to a certain level, but that it would be reasonable to require a reduction. However, the supervisory authority must always apply the reasonableness rule, which says that the requirements imposed must not be unreasonable, they added. The LEC addressed the following questions to illustrate the complexity of the issue "What is an abnormal amount of food waste?" and as previously mentioned "How should food waste be measured or quantified?" Moreover, the NFA referred to voluntary and self-responsibility also is this issue, and shared a document about an agreement in the food industry to reduce food waste (IVL Svenska Miljöinstitutet 2020). This described that the Swedish agreement will be run as an independent office. The proposal for the agreement consists of the following three components: 1) Objectives for reducing food waste 2) Data collection for monitoring the goals of the agreement and for finding "hot spots" to work with across the value chain 3) A forum and working groups to gather actors along the food chain for discussion and implementation of specific, cross-sectoral projects with the aim of accelerating the reduction of food waste.

In addition to the responses from the LECA and EPA already presented above, the CAB explained that many food operators have goals for food waste reduction, but that it is difficult for a supervisory authority to require a reduction to a certain level. This issue must be assessed in the individual case and requires that the operators have examined and reported their results before demands can be made. Finally they suggested that measuring and becoming aware of their food waste allows operators themselves to set goals for their work, which can then be followed up in supervision as part of their self-monitoring.

In conclusion, the answers to the first question (requirement of food waste quantification) were fairly divided between the non-municipal actors, resulting in 2/6 answering "yes", "no" or "do not know" respectively. The second question (requirement of food waste reduction from operations generating large amounts of food waste) was answered with as many "no" as "do not know" (3/6 respectively). Consequently, some of the authorities gave different answers to the two questions.

6. Discussion

This study sought to give an insight in the application of the general rules of consideration (GRC) in supervision for reduced food waste by investigating the current situation according to relevant actors (municipalities, the National Food Agency (NFA), the Environmental Protection Agency (EPA), one county administrative board (CAB), a Land and Environment Court (LEC), the Land and Environment Court of Appeal (LECA) and a private law firm), opportunities and obstacles as well as the attitude towards suggested practices. The purpose of this study is thus rather unique which is both a strength and a weakness. On the one hand, it can contribute to new knowledge in the field, while on the other hand there are no comparable studies to rely on. Yet, several studies linked to food waste and municipalities (Eriksson et al. 2018a; Suhonjic
2017; Eriksson et al. 2016), food waste quantification (Eriksson et al. 2017; Eriksson et al. 2018b) and reporting (Corrado 2019) as well as legislation affecting food waste (Giovannini et al. 2020; Martinsson 2014) have highlighted the need for further research in the area.

Nevertheless, given the scope of the study, it was limited to dealing with food waste in relation to food control and the GRC in the Environmental Code, rather than covering the entire food waste area. The study represents only a small part of the actors involved in the area, and the opinions of individual persons within each authority. On the other hand, actors were chosen based on a good spread, which increases the study's robustness.

Moreover, the choice of method has both advantages and disadvantages. Questionnaires are time efficient and enable thus greater collection of data. Additionally, they are likely to increase the response rate, when it is just a matter of replying to an email, as was the case in the present study. On the other hand, using this method can result in poorer data, as the respondents themselves decide how much time they want to spend on answering the questions. Also, the risk of misinterpretation is greater than in e.g. personal interviews where it is easier to ask follow-up questions (Bryman 2016). Given these limitations, the results should of course be interpreted with caution. It should also be borne in mind that the responses may represent personal opinions rather than the authorities' views, which might involve several inaccuracies.

However, with respect to the time frame for this study and the ongoing COVID-19 pandemic (WHO 2020), questionnaires in mail form where uncertainties could be resolved either by email or telephone contact, were considered the best option. Also, open-ended main questions were considered appropriate to counteract inaccuracies in the answers, as these types of questions require a narrative and thus give a greater insight into what is being told. Finally, the author's opinions and interpretations also play a role in this type of study, of course. Thus, in order to counteract bias, a solid attempt was made to present the results in a transparent way.

The results showed that a clear majority of the municipalities did not apply the GRC to food waste. However, some claimed that they did, but could not refer to any injunctions. This leaves room for questioning how this works in practice, since it seems unlikely that not a single operator has ever violated the regulations if they are applied. Also, those claiming that the rules were applied, referred to e.g. the municipality's meal service that works with reducing the food waste in municipal services, thus saying that there is no need to include food waste control in supervision. However, this statement seems to rather motivate the need for food waste supervision than serve as an argument for not conducting it. This is because if food waste would be included in the public food control, the same assessment would apply to all operators owing to the requirement of equal food control (Livsmedelsverket 2020h). Based on the above statement, the current approach seems to rather counteract equivalent handling of food waste.

Additionally, nearly half of the municipalities responded that the GRC mainly apply to environmentally hazardous activities, which reveals that they are applicable in other areas. Also, a majority of these municipalities indicated that the application of the GRC to food waste is not prioritized within the municipality. This raises the question whether food waste is not considered sufficiently environmentally hazardous to be supervised? And, if so, is this because the environmental impact is less visible as it has already taken place? Consequently, how environmentally hazardous does something have to be to need supervision?

Moreover, among the non-municipal actors, half did not know and two said that the GRC were not applied to food items. This is expected since many of these actors are not directly related to supervision. Yet, the authority most closely associated with municipal supervision (the CAB), had applied the GRC to food waste in a supervision project, which proves that this is currently happening at least at the project level. Indeed, of the total amount of respondents, two said that projects had been carried out where operators' food waste was controlled according to the GRC.

Furthermore, a slight majority of the municipalities were positive to applying the GRC to food supervision. This indicates that even if only a few have practical experience of this, there are others who believe that this would be possible. However, almost as many said that they did not know, and the identified obstacles were more than the opportunities. The main obstacles included legal issues, other

incentives or approaches and the lack of financial resources for such supervision. On the other hand, those municipalities being positive to applying the GRC to food waste, argued mainly that the GRC apply to all operators and referred to own projects or laws in other countries against food waste.

Of the non-municipal actors, only half answered this question and one (the LEC) was uncertain, arguing that an injunction should be clear enough for the food operator to know what to do, and questioned how food waste should be measured or quantified. The main arguments of those being positive to the idea were similar to those of the municipalities, namely that all operators can be supervised according to the Environmental Code and that the GRC had been applied in a supervision project for food waste prevention. In fact, of the total respondents, the two authorities (one municipality and the CAB) that had practical experience of applying the GRC in supervision projects for reduced food waste said that this was possible. An obstacle to doing this in project form is the need for financial resources, which indicates that this issue could be solved by including food waste prevention in the regular food control, since in that case it would be financed by the operator (Livsmedelsverket 2020i).

Based on the above, the lack of financial resources for food waste prevention through supervision is thus not a reasonable argument. Nevertheless, an analysis from the Swedish Agency for Public Management (Statskontoret 2015) shows that resource scarcity seems to be the main cause of deficiencies in municipal food controls. The problem is partly due to how the fees are charged and used, but also to staff shortages. One suggestion is that the government, through a change in regulations, allows supervisory authorities to charge in arrears instead of in advance, to ensure that enough is paid for the control carried out. Other proposals presented are a simplified risk classification model as well as more municipal cooperation in food control (Statskontoret 2015). No follow-up of the proposals has been found, but the above indicate that resource-related barriers to supervision should be possible to resolve and that interest in this has been highlighted.

The arguments referring to the legislation of other countries are less relevant in this context, since these deal with adapting new legislation (Brivio 2016) rather than suggesting the application of an existing law for reduced food waste.

Furthermore, the reasoning that there are other incentives for food waste reduction is reasonable, since preventing food waste is often related to saving money. Also, research shows that companies that are effective at addressing societal challenges tend to be rewarded with higher margins and higher TSR (total shareholder return), which should motivate companies to prevent food waste (Hegnsholt et al. 2018). However, food waste occurs also as a consequence of measures linked to increased economic profit (Eriksson et al. 2018a), and when food waste prevention is set against marketability (e.g. when the best-before-date has passed), companies prioritize the latter (Martinsson 2014). Consequently, there

is reason to question the argument that food waste is already being reduced to the greatest extent possible by food businesses.

Moreover, other municipal activities for food waste reduction might be successful, but since there is a lack of a common standard for quantifying and reporting food waste, the effects of such activities are difficult to evaluate or compare with others (Eriksson et al. 2017; Corrado et al. 2019). More research in this field is thus suggested in order to be able to tell the effect of such activities in a larger context. Yet again, the Swedish food industry accounts for a significant amount of the food waste (Andersson & Stålhandske 2020), and the total food wastage is growing both nationally and globally (Hegnsholt et al. 2018), which indicates that not enough is being done at the moment.

When it comes to the legal context, the issue becomes somewhat more complicated. On the one hand, food operators should be possible to supervise like any other businesses according to the Environmental Code. On the other hand, an evaluation of whether they can be applied in the individual case is needed. This includes e.g. consideration of the food legislation. Martinsson (2014) found that the food legislation does not contribute to unnecessary food waste, which can be interpreted as that there is no direct contradiction between the laws. On the other hand, Sörme et al. (2019) found that according to grocery store managers, food legislation and regulations are one of the biggest obstacles to food stores' waste prevention work. Thus, there seems to be a need to review the food legislation in order to say whether it is a problem for food waste prevention or not.

The comment that making an injunction require evidence of "abnormally large amounts of food" thrown away indicates that there is a need for food waste quantification if food waste supervision is to be included in food control. However, it raises the question what is meant by "abnormally large amounts" and whether it is reasonable to only require those operations that perform "abnormally badly" in this issue to make changes?

The overall result so far indicated that the reasons why the GRC are not considered to be applicable to food waste are either that it is not prioritized (due to lack of resources, for not being environmentally hazardous enough etc.) or the lack of knowledge (regarding legal issues). As the reasons behind its low priority are not considered unsolvable, the question arises if the respondents who stated these reasons are in fact lacking interest in the matter. This could be substantiated by Edlund (2015), who found that inspectors often feel that they have too many responsibilities and lack support from guiding authorities. In the present study, most of the municipal respondents were inspectors, which gives reason to assume that their personal opinions may shine through in these answers. Given that the GRC already are applied in supervision of other operators within the same authority and often even by the same inspector, it is reasonable to believe that it would rather be an opportunity than an impossibility to apply these rules on food operators as well.

When summarizing the different arguments, one can conclude that both the identified opportunities and obstacles included comments that did not really answer the question, such as using food waste for other purposes, referring to other laws or other approaches for reducing food waste. These comments, in combination with the fact that very few had concrete suggestions on how these rules could be applied in practice, indicate that the respondents might want to give the impression that this is a good idea, although they have nothing concrete to come up with. This, in turn, could again be a sign that other areas are given higher priority in supervision.

Moving on to the question of food waste quantification, to which the majority of the respondents answered either that it would be possible to require food waste quantification from food operators, or that they did not know. This indicates that even if there is still little practice in this field, there are more positive than negative attitudes to this. The positive ones included four municipalities, the CAB and the lawyer at the environmental law firm, referring to the GRC, the requirement of self-control and to operations where it is already carried out. The negative ones included two municipalities, the LEC and the NFA, that argued that there is lack of legal support to this, that it is impossible to impose such a requirement on all food operators, and that voluntary and self-responsibility should rule in this issue. Thus, some arguments were contradicted, which raised the question whether there really is legal support to this or not. Both the yes-side and the no-side included lawyers, which indicates that this may be a matter of statutory interpretation. Moreover, voluntary and self-responsibility might be involved at other stages of the food waste tackling, but since quantification forms the basis of food waste reduction (Eriksson et al. 2017; Eriksson et al. 2018b) it can be concluded that there should be clear guidelines and requirements regarding this.

Furthermore, contrary to the above, the proposal to demand a reduction in food waste in cases of high quantities was met by more resistance in addition to responses indicating that they did not know. The main argument against this was the lack of a statutory level for food waste and the difficulty of determining such a level. However, also in this case there were some respondents who claimed that this would be possible legally, which indicates that there is no commonly known answer to this question yet.

Finally, some actors suggested that even if establishing a certain level is complicated, it would still be possible to require a reduction as long as the reasonableness rule is applied. One suggestion could thus be to require quantification in the first place, and secondly a reduction to e.g. the municipal average food waste level within the category in question. This suggestion is supported by a case study in a Swedish municipality where researchers found a significant variation between kitchens regarding food waste, suggesting that an exchange of experience within a municipal meal organization should be able to reduce the food waste significantly (Eriksson et al. 2016).

In summary, no clear consensus was reached on the issue, neither regarding the application of the GRC in food control nor the proposed approach for reduced food waste. Nevertheless, it was found that applying the GRC to food control could be possible, according to some practical experience in the field and the majority of the respondents' attitudes. Additionally, no obstacles were identified that obviously cannot be solved, indicating that some stated opinions may be based on respondents' personal opinions rather than facts.

How the application of the GRC to food waste would work in practice remains to be solved, though. Contradictions regarding legal support and the impact of the Food Act were identified, which justifies further research in this area.

Given the overall results, the link between the current situation, the attitudes towards applying the GRC in food control as well as the attitudes towards the suggested practices, is ambiguous. This raises many questions, such as: If the application of the GRC to food waste is considered possible by most of the actors, why are they not applied then? Is it because the authorities have not thought about it, or because no one considers it their job to incorporate these rules in food control? Or simply because it falls far down the list of priorities?

The fact that the actual proposals for food waste prevention brought more resistance and uncertainty indicates that there is a gap between theory and practice on this issue. This again leads to the questions whether this is due to lack of knowledge, low priority or uncertainty about whose responsibility it would be to realize such proposals.

In fact, Edlund (2015) indicates that all of these factors play a role in the inspector work. For example, she found that there are wide variations in inspectors' legal knowledge as they often have different educational backgrounds. Also, legal security and reasonability assessments were found to be very difficult according to inspectors (Edlund 2015), indicating that these dimensions consume a lot of time and effort. Additionally, as already mentioned, inspectors admit that they experience a shortage of time due to too many responsibilities (Edlund 2015), which may mean that they are too busy to prioritize food waste control. Finally, Edlund (2015) found that the inspectors' professional role is unclear, which can be linked to uncertainty about whose responsibility it would be to implement supervisory approaches for food waste prevention.

In conclusion, there are many questions that remain to be answered. This study is a first attempt to highlight these and to propose a change for supervisory authorities in their work towards reduced food waste.

7. Conclusions

This study showed that the majority of the actors surveyed do not apply the general rules of consideration (GRC) to food waste currently, and none of them has used injunctions to prevent food waste. Despite that, there are opportunities in the form of both practical examples and positive attitudes to applying the GRC in food control to reduce food waste.

No apparent unsolvable obstacles were identified; however, legal contradictions justify the need for further research which could pursue the development of a supervisory approach for food waste prevention.

Consequently, the link between the current situation, the attitudes towards applying the GRC in food control as well as the attitudes towards the suggested supervisory practices, is ambiguous. The acquired knowledge is a first step in proposing a change for supervisory authorities in their work towards reduced food waste.

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Appendix 1

Popular science summary

Currently, one third of all food is lost or wasted globally. At the same time, world hunger is on the rise, and food production represents a significant part of the environmental problems we are facing today. Thus, preventing food waste is of vital importance in achieving a sustainable food supply chain.

To tackle this problem, some countries have established laws to reduce the domestic food wastage. In Sweden, on the other hand, the National Food Agency has recommended food inspectors to work according to already existing regulations to reduce food waste, namely the general rules of consideration (GRC) of the Swedish Environmental Code. These rules regulate the use of raw materials in Sweden. However, there is a lack of information on whether the GRC actually are applied by inspectors to reduce food waste, and, if so, how this works in practice.

Another problem is the lack of a common standard for quantifying food waste. This gives a vague picture of how different organizations are progressing and makes comparisons between them difficult.

Weaving together these problems, this thesis aimed to examine whether and how the GRC are or *can be* applied to prevent food waste. More specifically, the goal was to investigate the attitude of municipal supervisory authorities and other relevant actors towards applying the GRC in food control, and to identify opportunities and / or obstacles to this. Also, the purpose was to investigate the attitude towards suggested supervisory approaches for food waste prevention, such as 1) requiring that all food operations must quantify their food waste 2) requiring that an operation that has a high proportion of food waste must reduce its waste so that it falls below a certain level. Thus, the overall goal of this thesis was to contribute with knowledge that in the long term can generate supervisory approaches for reduced food waste.

The investigation was done using self-administered questionnaires. Answers were obtained from 11 municipalities and six additional actors including courts, national authorities and a private law firm.

The answers gave a picture of 1) The current situation regarding the GRC and their application 2) The attitude towards applying the GRC in supervision for food

waste reduction 3) The attitude towards suggested supervisory practices for reducing food wastage.

Interestingly, the results showed that most of the actors surveyed did not apply the GRC to food waste currently, and none of them had issued injunctions to prevent food waste. Nevertheless, positive attitudes and practical experience in the field revealed that applying the GRC to food control could be possible. Yet, the identified obstacles were more than the identified opportunities, but not considered unsolvable. How the application of the GRC to food waste would work in practice remains to be solved, though.

In conclusion, the link between the current situation, the attitudes towards applying the GRC in food control as well as the attitudes towards the suggested supervisory practices, was found to be ambiguous. Many interesting questions were raised as well as legal contradictions, which justify the need for further research in this area. The acquired knowledge is a first step in proposing a change for supervisory authorities in their work towards reduced food waste, and plays a significant role in both the economic, social and environmental sustainability that food waste forms part of.

Appendix 2

Email with questions to municipalities

Hej!

Mitt namn är Ida Escudero Saukko och jag studerar till livsmedelsagronom vid Sveriges Lantbruksuniversitet i Uppsala. Jag kontaktar er då jag skriver mitt examensarbete om matsvinn och undersöker *om och hur kommuner kan tillämpa hänsynsreglerna i miljöbalken för att minska matsvinnet.* Jag undrar om jag skulle kunna få kontakt med någon hos er som kan svara på följande frågor (gärna skriftligt om möjligt):

- Hur tillämpas miljöbalkens hänsynsregler (2 kap. 5 §) i er kommun idag?
- Tillämpas hänsynsreglerna på livsmedelsobjekt?
    - Om ja, hur många förelägganden har ni skrivit?
    - Om nej, varför inte?
- Bedömer ni att det skulle vara möjligt att tillämpa dem på livsmedelsobjekt (inom tillsyn), i syfte att förebygga matsvinn?
- Hur skulle detta i så fall gå till?

Jag kommer inte att publicera några namn i min uppsats, utan enbart nämna vilka kommuner/befattningar jag varit i kontakt med.

Stort tack på förhand!

Med vänliga hälsningar

Ida Escudero Saukko
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Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Appendix 3

Email with questions to other actors

Hej!

Mitt namn är Ida Escudero Saukko och jag studerar till livsmedelsagronom vid Sveriges Lantbruksuniversitet i Uppsala. Jag kontaktar er då jag skriver mitt examensarbete om matsvinn och undersöker *om och hur man kan tillämpa hänsynsreglerna i miljöbalken för att minska matsvinnet*. Jag undrar om jag skulle kunna få kontakt med någon hos er som kan svara på följande frågor (gärna skriftligt, om möjligt):

- Hur tillämpas miljöbalkens hänsynsregler idag?
- Bedömer ni att det skulle vara möjligt att tillämpa miljöbalkens hänsynsregler (2 kap. 5 §) i tillsyn för att förebygga matsvinn?
- Hur skulle detta i så fall gå till?

Jag kommer inte att publicera några namn i min uppsats, utan enbart nämna vilka myndigheter/befattningar jag varit i kontakt med.

Stort tack på förhand!

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Appendix 4

Email with follow up questions

Hej!

För ett tag sedan hjälpte ni mig i mitt examensarbete genom att svara på frågor om miljöbalkens hänsynsregler och matsvinn. Nu återkommer jag för att ställa ett par sista följdfrågor och skulle bli väldigt glad om ni hade möjlighet att svara på dem. Se nedan:

Anser ni att en tillsynsmyndighet skulle kunna ställa följande krav på livsmedelsverksamheter:

1. **Att alla livsmedelsverksamheter måste mäta sitt matsvinn**

2. **Att en verksamhet som har mycket matsvinn måste minska sitt svinn så att de kommer under en bestämd nivå?**

Jag kommer inte att publicera några namn i min uppsats, utan enbart nämna vilka myndigheter/befattningar jag varit i kontakt med.

Stort tack på förhand!

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Appendix 5

Themes and coding categories for data analysis

MUNICIPALITIES (No. of respondents: 11)

1 - The current situation in municipal supervision

Questions:

How are the general rules of consideration (GRC) in the Environmental Code applied today?

Are the GRC applied to food waste (FW)?

Answers related to:

Not applied to food items / applied very little	8
Applied to food items	3
Environmentally hazardous activities	5
Facilities for food production	2
Food legislation vs the Environmental Code	5
Not prioritized in food	3
Injunctions made	0
Other municipal projects for food waste reduction	4

2 - Attitude towards applying the rules of consideration in municipal supervision for food waste reduction

Question 1:

Would it be possible to apply the GRC in supervision in order to reduce FW?

Answers related to:

Yes	5
No	2
Maybe	4

Question 2:

How would this be done?

Answers related to:

No plan	2
Suggestion to require food waste to be used as feed	1

Question 3:

What opportunities / obstacles are there for applying the GRC in supervision with the aim of reducing FW?

Answers related to:

<u>Opportunities</u>	
The rules of consideration apply to all activities	2
Reference to other countries, global goals etc	2
Possibility of collecting food waste in the muni.	1
<u>Obstacles</u>	
Other incentives	3
Legal issues	4
Financial resources	3
Classification of waste	2
Specification of which levels to apply	1
Other approaches for food waste reduction	5

3 – Attitude towards suggested supervisory practices for reducing food waste

Question 1:

Would a supervisory authority be able to require that all food operations must quantify their FW?

Answers related to:

Yes	4
No	2
Do not know	4

Question 2:

Would a supervisory authority be able to require that an operation that has a high proportion of FW must reduce its waste so that it falls below a certain level?

Answers related to:

Yes	3
No	3
Do not know	4

OTHER ACTORS (No. of respondents: 6)

1 - The current application of the rules of consideration

Question:

How are the GRC in the Environmental Code applied today?

Answers related to:

Not applied to food waste	1
Applied to food waste in a supervision project (reference to documents)	1
Do not know (due to lack of court practice)	2
Do not know (reference to another agency)	1
Reference to document about waste prevention and the rules of consideration in the Environmental Code	1

2 - Attitude towards applying the rules of consideration in supervision for food waste reduction

Question 1:

Would it be possible to apply the GRC in supervision in order to reduce FW?

Answers related to:

Yes	2
Uncertain	1
No answer	3

Question 2:

How would this be done?

Answers related to:

Project material	1
Supervision by environmental protection administrators	1

Question 2:

What opportunities / obstacles are there for applying the GRC in supervision with the aim of reducing food waste?

Answers related to:

<u>Opportunities</u>	
All operators can be supervised	1
Applied in a supervision project for waste reduction	1
Legislation, quantification (EPA document)	1
<u>Obstacles</u>	
Other incentives	1
No former practices	2
Other projects for food waste prevention (EPA document)	1

3 – Attitude towards suggested supervisory practices for reducing food waste

Question 1:

Would a supervisory authority be able to require that all food operations must quantify their FW?

Answers related to:

Yes	2
No	2
Do not know	2

Question 2:

Would a supervisory authority be able to require that an operation that has a high proportion of FW must reduce its waste so that it falls below a certain level?

Answers related to:

Yes	0
No	3
Do not know	3